Balcrank®

Director Jr.

Model #3110-032
24V AC Output

⚠ CAUTION

It is strongly recommended that shielded wiring be used for ALL impulse meter connections. The use of unshielded wiring could results in erroneous dispense volumes. The Director batch register and the totaling register will read the correct amounts requested, but the actual dispense volume will be less. This condition is a result of the unshielded wiring picking up stray signals from adjoining electrical wires and/or electrical equipment. If unshielded wiring is used, the condition described above will not be covered under Balcrank's Product Warranty.

Thoroughly read and understand this manual before installing, operating or servicing this equipment.

OPERATION, INSTALLATION, MAINTENANCE AND REPAIR GUIDE

GENERAL SAFETY REQUIREMENTS

NOTE: THOROUGHLY READ AND UNDERSTAND THIS MANUAL BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT.

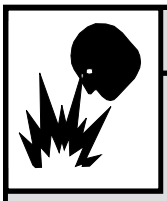
⚠ IMPORTANT

Check equipment regularly and repair or replace worn and damaged parts.

Never alter or modify any part of this unit, doing so may cause damage to the unit and/or personal injury.

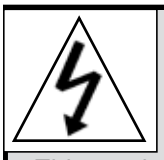
Always read and follow the fluid manufacturer's recommendations regarding the use of proper use, handling, and disposal.

Release pressures built up in the system before any service or repair is begun on a pressurized component on the system (e.g. filters). See the pressure relief procedure below.



⚠ WARNING

DANGER: Not for use with fluids that have a flash point below 100°F (38°C). Examples: gasoline, alcohol. Sparking could result in an explosion which could result in death.



⚠ WARNING

High Voltage may be present when servicing this equipment. This equipment should only be serviced by authorized persons. **Remove power from the console before attempting to replace the fuse.**

⚠ WARNING

Pressure Relief Procedure:

Follow this procedure whenever you shut off the pump, when checking or servicing any part of the system and when installing, cleaning or changing any part of the system.

1) Disconnect the air to the pump.
2) Point dispensing valve away from yourself and others.
3) Open dispensing valve until pressure is relieved.

⚠ WARNING

A pressure relief valve at the fluid supply point is mandatory for protection of the system and personnel, and to maintain the warranty in effect. Relief Kit 3120-085 (1/2" NPT) or 3120-086 (3/4" NPT) will protect the system from possible overpressure damage. Excess fluid pressure above 850 psi (56 bar) is relieved. Relief over flow is directed back into the supply container to reduce the risk of equipment damage or serious bodily injury.

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INTRODUCTION

General Description

Controlled dispensing of motor oil, ATF, gear oil, and antifreeze is available with the electrical DIRECTOR JR. The unit allows the selection of one of up to ten (10) stations. One Director Jr. is required for each fluid type dispensed. The console size is very small allowing for easy placement of as many units as may be required for the number of fluids to be dispensed. Each unit is completely self-contained. The units of measure are normally quarts or pints, depending on the selection of the in-line meter used. Gallon and liter meters are also available. The voltage controlling the solenoid valves and the impulse meter voltage is 24 VAC.

System Specifications

Power Required ..... 110 VAC, 60Hz

Control Capacity ..... 1 Product, 10 Stations

Operating Temperature ..... 0° - 140° F (-17° - 60° C)

Maximum Amount Dispensed ..... 99,999.9 Units of Volume

Impulse Meter Rating ..... Maximum of 35 VAC, 0.01 amp

Resolution ..... 0.1 Unit of Volume

Control Output Rating ..... 24 VAC, 1/2 amp Max.

Dimensions ..... 5.7” H x 6.7” W x 5.7” D

Maximum Flow Rate ..... 20 Units per Minute

Cable Length ..... 6 feet

PRODUCT SPECIFICATION

Figure 1 shows a simplified, pictorial schematic of one product controlled to 5 stations and referenced extension of a sixth station addition.

Typically, the following items are necessary:

1. Director Jr. (3110-032) - The Director Jr. allows centralized control and monitoring of individual deliveries as well as a running total.

2. Isolation Air Valve (3230-004) - This valve will isolate the pump, air regulator, and air solenoid valve for any servicing requirements, etc.

3. Air Regulator - To regulate air pressure to the pump, so not to exceed 80 psi and/or limit pump output pressure to 850 psi (59 bar) if normal air supply would make it higher than recommended.

4. Air Solenoid Valve (3120-011) - This valve opens and closes air line to start the pump when activated by the Director Jr. (Balcrank recommends this feature to help prevent accidental spills.)

5. Pumps - 1.3:1, 3:1, 5:1, and 10:1 ratios can provide and maintain sufficient line pressures and fluid volumes for most systems (system plumbing length will dictate pump ratio required).

6. Impulse Meters - Electric impulse meter measures the amount of fluid that is being dispensed. There are four types of impulse meters available; quart, liter, pint, and gallon.

7. Relief Kit (MANDATORY IN EACH SYSTEM) - **3120-085** for 1/2" NPT or **3120-086** for 3/4" NPT systems. The Relief Kit limits fluid pressure buildup in lines due to thermal expansion, by relieving fluid pressure over 850 psi (59 bar).

8. Gate Valve - Isolates the pump and fluid meter from fluid flow-back when servicing, etc.

9. Fluid Shut-off Valve (3230-002) - Isolates solenoid valve and dispensing station for servicing, etc.

10. Fluid Line Y-Strainer (3120-010 for 3/4" or **3120-040** for 1"**)** - Protects system against foreign contaminants.

11. Fluid Solenoid Valve (3120-012) - This valve opens fluid line to dispensing station when activated by the Director Jr.

12. Ready Light (3120-031) - Alerts the operator when the fluid at his station has been enabled for dispensing.

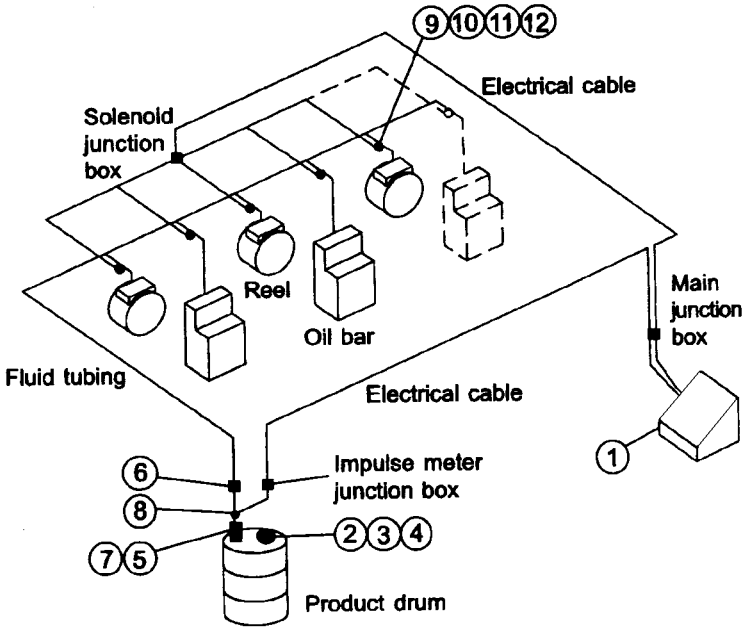


Figure 1
Pictorial of a typical Director Jr. installation

Interconnection Box

There is no interconnection box or junction box provided with the Director Jr. because all of the electronics are contained in the console. A multiwire cable is provided to connect in any convenient wiring box.

Impulse Meter

An impulse meter is used in the system to measure the amount of fluid dispensed. This meter is actually a simple flow meter that is installed in the fluid line. Inside the impulse meter is a rotating cam that actuates a small microswitch that sends electrical impulses to the console. One impulse is generated for every tenth of a unit volume of fluid that flows through the meter.

INSTALLATION

General

To determine the installation requirements for a Director Jr. system(s), certain factors need to be established. In general, these factors will determine how much material such as cable wire, fluid lines, pumps, and etc. will be needed. Answers to these questions below will help determine your material requirements.

1. Determine how many fluid types are to be dispensed. This will determine how many Director Jr. systems will be needed.

2. The number of reels or oil bars and solenoid valves needed will be determined by the number of stations to be serviced.

3. Decide where to locate the console(s), the reels, and oil bars, and the fluid supply tanks. Once these locations are established, the lengths of wire, cable, and fluid lines can be determined.

⚠ WARNING

A pressure relief valve at the fluid supply point is mandatory for protection of the system and personnel, and to maintain the warranty in effect. Relief Kit 3120-085 (1/2” NPT) or 3120-086 (3/4” NPT) will protect the system from possible overpressure damage. Excess fluid pressure above 850 psi (56 bar) is relieved. Relief over flow is directed back into the supply container to reduce the risk of equipment damage or serious bodily injury.

Plumbing

The Director Jr. system is a custom assembly tailored to specific needs depending on the relative position of equipment, the number of products controlled and the number of stations for each product. To control a product which will be monitored, an electric impulse meter will be installed in the main hydraulic line coming from the pump or source of fluid supply, (Figure 1, Item 6). The meter has 1/2” female pipe threads at both inlet and outlet. It is recommended that the meter be installed on a rigid line which will give it support. It is recommended that a flexible hose be attached between the pump and the meter. This will allow for slight movement or flexing of the inlet line.

To make sure the system is as tamper proof and inconspicuous as possible, the impulse meter can be installed at any point in the hydraulic line between the fluid source and the first branch of the system. In this case a short length of hose at one end is suggested to simplify the piping hook-up. A careful study of the floor plan of the building where the system is to be installed should be made to determine the best location for this meter, considering ease of installation and length of wiring to the console.

The electric solenoid valve (3120-012) is installed in the hydraulic line as near to the point of dispensing as possible (Figure 1, Item 11). One valve must be installed in the line of each outlet to be controlled. It is suggested that a manual by-pass valve be installed around the solenoid valve as shown in the diagram (Figure 1, Item 9). This allows the solenoid valve to be by-passed in case of electric power line failure. The by-pass valve should allow for locking in either the open or closed position by means of a padlock or sealing wire to avoid tampering.

ELECTRICAL

Refer to Figures 2 and 3 for electrical installation.

Installation should be made in accordance with the National Electrical Code (NFPA 70) and the Flammable and Combustible Liquids Code (NFPA 30).

Power input to the Director Jr. is 110 VAC. All control circuits are 24 VAC which are not normally restricted by electrical codes, however, local codes should be checked for applicability, and all electrical installations should comply with codes.

Place the console(s) where it will normally be used. All electrical connections are made through the multi-wire cable supplied with the unit. Some kind of pull box should be mounted within 5 feet of the console. A suitable place might be behind a desk or in the ceiling where the existing electrical system is likely located. Connect the supplied cable to a screw type terminal strip with 14 terminals that is mounted inside the box as indicated in Figure 2.

No. 18 AWG wire is recommended for all runs less than 400 feet. For runs from 400 to 625 feet, use wire no. 16 AWG or larger. Normally the 24 VAC wiring can be run around the overhead structure of the building without using conduit. This wire should be clamped or secured to the structure in such a way that it is not subject to any mechanical stress. Use a strain relieving clamp any time a cable enters a junction box. The cables from all the consoles in the system can be run to one junction box with conduit running to the 110 VAC circuit breakers and then using multi-wire cable for the control circuit runs.

Another junction box should be installed within a few feet of the impulse meter (less than 10 feet). A control cable can then be used to run between this box and the console junction box. Solderless connections (wire nuts) can be used for the connections in this box.

Another junction box or group of boxes should be mounted near the solenoid valves. In the case of a reel bank, one junction box may suffice for several valves. In the event that a number of reel banks or oil bars or other dispensing points are used, it may be necessary to locate separate junctions boxes at each dispensing location. The two wires from each electrical solenoid valve should be run inside of plastic or metal sheathing for mechanical protection. In the event that the junction box is located at a distance from the valve greater than the length of the valve wires, it may be necessary to splice two ends of the wires together, soldering them and then covering the connection with heat shrinking tubing.

An optional extra to the system is a “Ready” light (3120-031). This light is installed within sight of the dispensing mechanic. It may be attached to the side of the reel bank, oil bar, or an adjacent wall. The wires of the “Ready” light are run to the solenoid valve junction box and are wired in parallel with the valve.

⚠ CAUTION

Before attempting to operate the system a careful check should be made of all wiring to assure that all connections are secure and that no frayed leads cause an unwanted connection between terminals or leads.

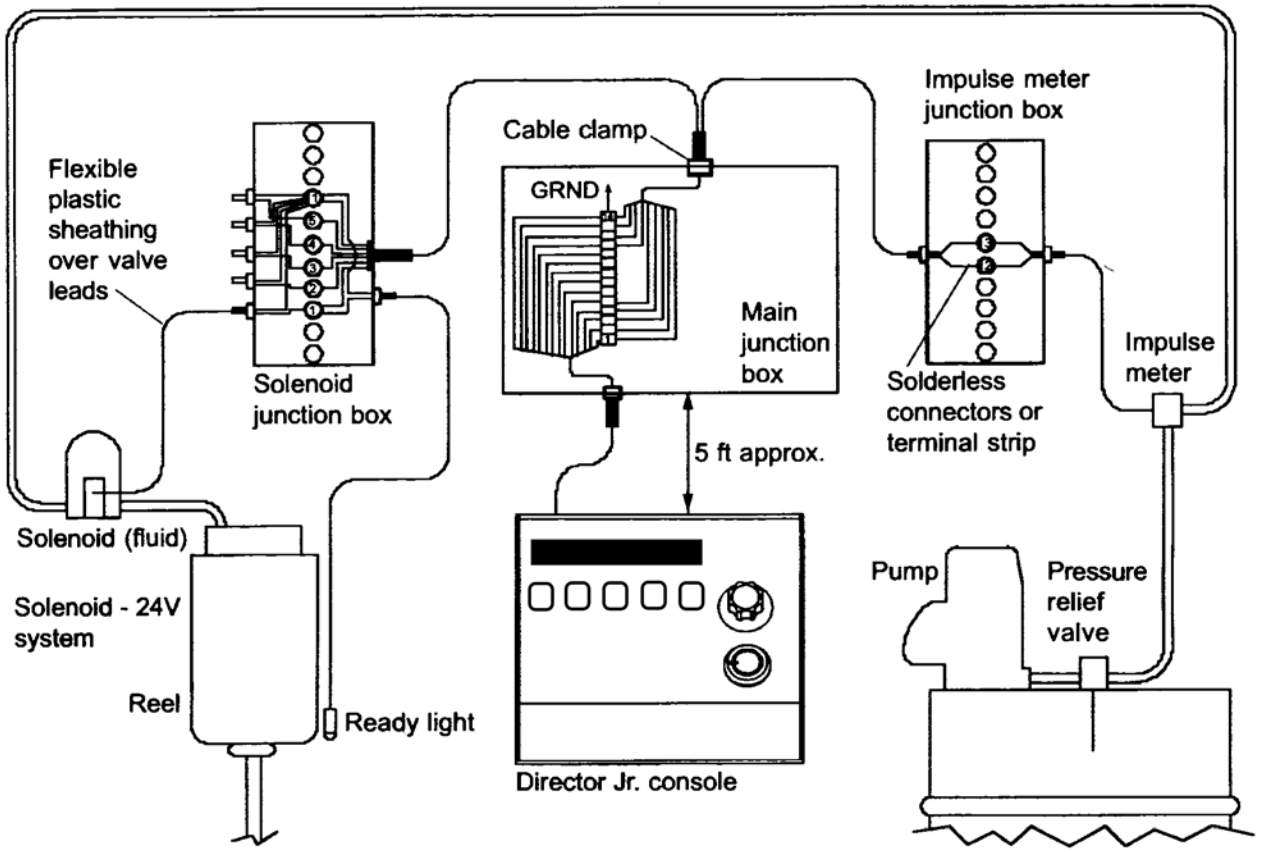


Figure 2 - Electrical System Installation Schematic

Terminal Strip & Conductor No.	Color	Use
1	Black	Numbers 1-10 individual conductors for solenoid valves
2	White	
3	Red	
4	Green	
5	Orange	
6	Blue	
7	White/Black Tracer	
8	Red/Black Tracer	
9	Green/Black Tracer	
10	Orange/Black Tracer	
11	Blue/Black Tracer	Common for solenoid
12	Black/White Tracer	Impulse meter
13	Red/White Tracer	Impulse meter
14	Green/White Tracer	Pump air solenoid
15	Blue/White Tracer	Unused

Figure 3 - Cable Color Code Chart

CONSOLE SETUP INFORMATION

General

Director JR. 3110-032, VAC comes preprogrammed with pulse settings from the factory. The standard pulse meters for the system all count 10 pulses per unit of volume dispensed. Units shipped from the factory come pre-programmed for quarts.

When the system is powered on, the display will indicate:
- the current system settings with a delay of 2 seconds (see image 2 below)
- the total ammount dispensed with a delay of 2 seconds
- normal operation display (see image 1 below)

Image 1 - Normal operation display

Image 2 - Current System Settings; Units and Pulses Per Unit

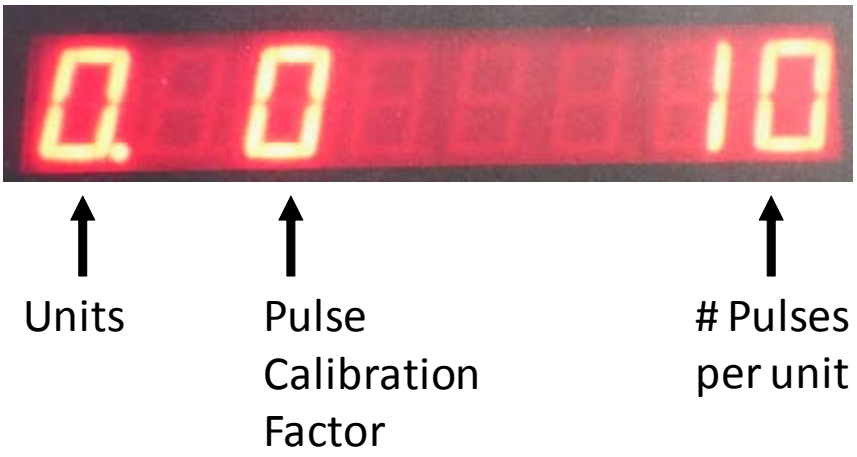
The first Digit indicates the current unit setting (see table below), and the last 2 digits indicate the pulses per unit. For the image above the unit is set to quarts and 10 pulses.

First Digit	Unit of Measure	Pulses per Unit
0.	Quarts	10
G	Gallons	10
P	Pints	10
L	Liters	10

CONSOLE SETUP INFORMATION (CONTINUED)

Entering the Setup Menu:
- Start with the unit powered OFF
- While pressing the “Zero” and “Up arrow” buttons, power on unit by turning key to “ON” position.

SETUP DISPLAY

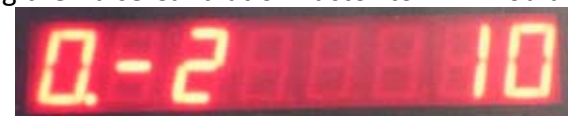


Pulse Calibration Factor:
- Can be set to 1 through 5, or negative 1 through 5, allowing you to adjust pulses per unit from 5 to 15.

- Use the “Up arrow” key to scroll between Quarts, Gallons, Pints, and Liters.
  - Press the “SET” button to enter edit mode (The Pulse Calibration Factor will begin flashing)
  - Use the “Up arrow” key to change the numerical values from 0 to 5, -1 to -5
  - Press the “SET” button to exit edit mode
- When finished press the “TOTAL” button to save changes.
- Wait till the display looks like -->

- Power unit off with key

- Example
  - Setting the Pulse Calibration Factor to “-2” would look like:



  - When powering the unit on the display will show:

  - Unit set for Quarts and 8 pulses per unit

POST INSTALLATION CHECK

If manual by-pass valves have been installed at the solenoid valves (Figure 1, Item 9), they should be opened to allow checking the system for leakage before the electrical check out. The pumps should be set to operate at normal pressure (500 psi maximum), and oil drawn from each dispensing point. When it is certain that all air and foreign materials have been purged from all lines, the piping system should be checked for leaks. The by-pass valves should be closed before proceeding with the electrical check out.

Operational Check

1. Double check all electrical connections for correctness and possible shorts and opens.

2. Turn on the circuit breaker for the console to be checked (it is suggested that only one system be checked at a time.

3. Follow the Normal Operation procedure below, being sure to enter a large amount for this trial run.

4. Rotate the Station Selector switch to each position. Stop at each position and make sure the solenoid ..... valve and the remote “Ready” light for the station selected is on. Check to make sure no station is enabled .... other than the one selected. Also make sure the air pump is activated for the product associated with .....the unit being checked out. As each station is enabled and the lines pressurized, check for leaks. NOTE: Leakage not only causes a mess and a loss of product but it will also cause erroneous control of the .....amount of the product delivered.

5. As each station is checked out, draw some fluid from each line to make sure that the lines are free of air ... pockets. Also make sure it is the correct fluid.

6. Now that the lines are clear of air, dial in an appropriate amount of fluid and check the accuracy of delivery of each type of fluid.

It is suggested that when the check out is complete, that the consoles and their associated circuit breakers be labeled by fluid type.

OPERATION INSTRUCTIONS

⚠ CAUTION

It is strongly recommended that this system not be considered fully operational until the “POST INSTALLATION CHECK” has been completed. Once the circuit breakers controlling the power to the system are turned on, all operations are controlled from the console.

Normal Operation

1. Turn power key lock switch to ON.
2. Set Station selector dial to desired setting.
3. Push “SET”; “SET ACTIVE” light should come on.
4. Push “SELECT”; the far right digit will flash. Adjust the digit value using the up arrow. Push “SELECT” to ... move to the next digit. Repeat these steps for all required digits.
5. When completed, push “SET”. “READY” light should come on and stay on for the delivery.
6. Dispense fluid.
7. If the entire amount is not dispensed, press “ZERO” to zero the count.

Totalizer Operation

The totalizer will accumulate and display the pulses received on the count input terminals. The Totalizer is factory preprogrammed with a decimal value of 0.1, but it displays only the whole number accumulations that are also indicated on the dispense counter (e.g. 120.3 on the dispense counter = 120 on the Totalizer). Count capacity is 8 digits. To read the total, press and hold “TOTAL”.

Key lock Operation

The Director Jr. is equipped with a security key lock to enable the system. The key must be inserted and turned to the ON position (12 o’clock position) to enable dispensing. The Director Jr. should have power applied prior to turning on the key lock switch to assure that the controller is initialized.

Ready Light Operation

The Director Jr. is equipped with a red light to indicate when the dispensing system is armed and ready for dispensing. If the light is not illuminated then the system is not operational.

Station Rotary Switch Operation

The Station Rotary Switch controls the station which is authorized to dispense the preset amount. Stations are numbered 1 through 10.

Example

Assume that the operator of station 3 wants to add 4 quarts of oil to a car. He contacts his supervisor who will enable the Director Jr. to meter the required oil. The supervisor would perform the following steps:

1. Assure that the Director Jr. has power.
2. Push in and turn the key lock switch to the ON position.
3. Turn the station rotary switch to the number 3 position.
4. Push “SET”.
5. Push “SELECT” button until the second digit is flashing. Use the adjust the digit to 4 using the up arrow.
6. Push “SET” and the ready light will illuminate and the operator in station 3 is enabled.
7. The operator in station 3 dispenses the fluid. The counter decreases in tenths and the totalizer increases in whole numbers.
8. When the counter reaches 0.0, then the ready light turns off and dispensing is complete.
9. Turn off the key lock switch to prevent further unauthorized dispensing.

Emergency Stop

In the event that the fluid flow must be stopped immediately due to leakage or other emergency situation, **TURN OFF THE KEY LOCK SWITCH**. This action shuts off the solenoid valve which stops the flow of fluid. *Simply unplugging the Director Jr. will not provide emergency shutoff.*

Reset

If the amount of delivery needs to be changed or corrected after “SET” has been pressed or after flow of fluid has already started, press zero and start over. If some fluid has already been dispensed, that amount should be subtracted from the new setting.

SERVICE AND MAINTENANCE

General

No attempt should be made to repair the Director Jr. console unit. A certain amount of information about servicing and troubleshooting is provided in this manual but if questions arise, contact your Balcrank Service Representative or the Balcrank factory Service Department. Customer repairs that are beyond the scope or this manual become the sole responsibility of the customer.

Periodic Inspection

Inspection of the Director Jr. system should be conducted at regular intervals by qualified personnel. The frequency of these inspections should be based on operating rate and environmental conditions. While the system is built for excellent reliability, the complete system, including the electronic, electro-mechanical and mechanical parts need periodic inspection for optimum life. Here is a suggested list of areas to check:

1. Inspect the wiring, cable, and electrical connections.
2. Make sure all components of the system are still secured properly on their mounting surfaces.
3. Check all screws, nuts and bolts to make sure they have not worked loose.
4. Carefully clean the console with a lint free cloth dampened with a mild detergent. Do not pour or spray ..... cleaner directly on the console. DO NOT LET LIQUID ENTER THE CONSOLE.
5. Check all switches and lamps for proper operation.
6. Refer to POST INSTALLATION CHECK to verify for proper operation.

⚠ WARNING

Make sure that the power is turned off before removing any components or disconnecting any connections or wiring.

Troubleshooting

In order to properly troubleshoot the system and perform replacement or repair of parts, it is necessary that the technician performing the work be thoroughly familiar with the equipment. Attempted repair by unqualified personnel could void the warranty. It is suggested that this manual be studied thoroughly before any trouble-shooting is attempted.

It is suggested that whenever there is a problem with the system that a visual inspection first be made of the overall condition of the equipment. Here is a list of things to look for:

1. Inspect for corrosion of components or wiring.
2. Check for frayed or broken insulation of wires and cables, and make sure their connections are secure.
3. Make sure all components are mounted securely.
4. Check front panel components to make sure none are cracked or broken.
5. All deficiencies should be corrected before proceeding with troubleshooting.

TROUBLESHOOTING CHART

In order to properly troubleshoot the system and perform proper replacement or repair of parts, it is necessary that the technician performing the work be thoroughly familiar with the equipment. Attempted repair by unqualified personnel could void the warranty. It is suggested that this manual be studied thoroughly before any troubleshooting is attempted.

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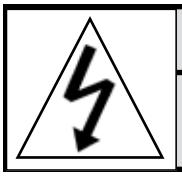

⚠ WARNING

Make sure that the power is turned off before removing any components or disconnecting any connections or wiring.

Symptom	Cause	Solution
1. No power at console.	Blown fuse.	Replace fuse.
	Circuit breaker tripped.	Reset breaker at main panel.
	Unit not plugged in.	Plug unit in.
	Damaged line cord.	Replace line cord.
	Cable not connected or properly seated.	Plug in cable connector.
	Key lock switch off.	Turn on key lock.
2. System power is on but the keypad will not accept any inputs	Unit is defective	Return the unit for repair.
	Cable is not connected or properly seated.	Plug in cable connector.
3. Display not illuminate, or digit elements are incomplete.	Counter is defective.	Return the unit for repair.
4. Console controls the wrong fluid.	Control wires to the solenoid valves are improperly connected.	Rewire as specified.

Symptom	Cause	Solution
5. System has power and goes into ready mode, but no fluid can be dispensed.	Pump is not operating.	Check the air supply to the pump and the pump air solenoid valve.
	Out of fluid.	Check the fluid level in the storage container.
	Control solenoid valve not operating.	Check valve for energized position.
	Outlet of pump is blocked.	Check impulse meter and control solenoid valve for blockage.
	Defective station selector switch.	Return the unit for repair.
	System not properly wired.	Recheck electrical connections and rewire as specified.
	Cable not connected or properly seated.	Plug in cable connector.
6. Fluid does not cut off at the correct preset	Impulse meter set up for the wrong units.	Check the impulse meter for the correct volume per pulse.
	Impulse meter cam plate not actuating pulse switch at each cam lobe. The pulse switch is out of position.	Check the position of the pulse switch in relation to the cam lobes. Also check for broken cam lobe. Adjust or replace as required per meter instructions.
	Defective unit.	Return the unit for repair.
7. Remote “Ready” light will not come on, but the console “Ready” light does.	Remote “Ready” light bulb burned out.	Replace bulb.
	Remote “Ready” light improperly wired or faulty wiring.	Correct or replace remote wiring.

FACTORY SERVICE

Repair

No attempt to repair the Director Jr. should be made beyond the scope of this manual. The modular design of the unit, made possible by the use of integrated circuits, makes it necessary to have access to special test equipment if serious damage to the system is to be avoided. The unit should be returned to a Balcrank authorized Service Center for repair or adjustment.

Parts List

Key 832011
Fuse (1 amp, 250V).....833445
Cable only (for 3110-032).....832013

Associated Components

Pressure Relief Kit (1/2” NPT)..... 3120-085
Pressure Relief Kit (3/4” NPT)..... 3120-086
Isolation Air Valve (1/2” NPT) 3230-004
Air Solenoid Valve 3120-011
Impulse Meter (liter)..... 3120-005
Impulse Meter (pint)..... 3120-006
Impulse Meter (quart) 3120-007
Impulse Meter (gallon)..... 3120-008
Impulse Meter (quart, coolant)..... 3120-016
Fluid Shut-off Valve (1/2” NPT)..... 3230-002
Fluid Line Y-Strainer (3/4” NPT) 3120-010
Fluid Line Y-Strainer (1” NPT) 3120-040
Fluid Solenoid Valve..... 3120-012
Ready Light 3120-031

Revision Log:

Rev. A - Release
Rev B - Added additional setup instructions

NOTES:

For Warranty Information Visit:
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